RECREATION DEMAND FOR PRIVATE-BOAT SPORT FISHING: The 1981 Lake Erie Western Basin Walleye Season

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March, 1982

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and
Ohio Agricultural Research and Development Center

ABSTRACT

Travel cost demand equations are estimated for private-boat walleye fishing in Lake Erie during 1981. These equations yield a consumer surplus estimate of $41 per day and a total willingness-to-pay estimate of $93 per day. The economic value of private-boat walleye fishing is estimated at $84 million.

BIOGRAPHICAL SKETCHES

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This paper contributes to the recreational demand literature through estimation of demand for private-boat sport fishing in the Western Basin of Lake Erie for the 1981 walleye season. Preliminary estimates of travel cost models are used to derive estimates of net consumer surplus for the Western Basin walleye fishery. These estimates are combined with data on fishing expenses and alternative estimates of travel costs to derive total willingness-to-pay estimates on per trip, per day, and season aggregate bases. Further specification and analysis is planned to examine the interrelationships among number of trips, length of trip, and walleye kept per trip.

Lake Erie is the fourth largest of the five Great Lakes. The Lake is usually divided into three basins on the basis of depth: the shallow Western Basin, the Central Basin, and the Eastern Basin. Conditions in the shallow Western Basin potentially make Lake Erie the best freshwater fishery in the world. Maumee and Sandusky Bays offer 90 square miles of sheltered waters, an ideal habitat for fish spawning. The Lake Erie fishery is second only to the New England cod fishery in terms of fish populations (The Beacon).

Sample Characteristics

The data base for this study consists of 350 private-boat sport anglers who responded to a questionaire about their fishing activities.

*Support for this research is from Ohio Sea Grant.

Table 2. Walleye Kept

- 63 per Group per Season
- 28 per Person per Season
- 9 per Group per Trip
- 5 per Group per Day
- 2 per Person per Day

Table 3. Expenditures

- $860 per Group per Season
- $153 per Group per Trip
- 19% on Bait and Equipment
- 36% on Gas and Oil
- 21% on Boat Repairs, Launching and Supplies
- 22% on Food and Lodging

Methodological Framework

The Ohio Lake Erie sport fishing experience has no observable market price with which to measure its value. Nonmarket techniques must be used to estimate the economic value of walleye sport fishing in the Western Basin of Lake Erie. Travel cost models are used for estimation of the economic value of walleye fishing in these preliminary results.

In order for the demand framework underlying the travel cost model to be valid, it must be assumed that no substitute or alternative experiences exist for the Lake Erie sport fishing experience. Lake Erie is the only body of water of its size and quality in the midwest. It is shallow and warm-watered, which implies ideal growth conditions for

demand curve DC and above the price line PC. Total willingness-to-pay is then the area ODCQ plus the expenditures on fishing at the site.

The travel cost model is one of several techniques which can be used for estimation of the demand curve in Figure 1. In the model, the relationship between number of trips and the cost per trip is estimated while controlling for other factors (Dwyer, Kelly and Bowes, 1977)

(1) # Trips = f(Cost/Trip, other factors),

where other factors include variables such as fishing costs, number of days per trip, hours fishing per day, income, size of fishing group, and years fishing at the lake.

Empirical Results

The travel cost per trip consists of two components: vehicle or driving costs and opportunity costs or the income earnings opportunities foregone because of time spent traveling to and from Lake Erie. The vehicle cost is estimated as

(2) VC = 2($0.15 + $1.30/mpg) (one-way miles)

where $1.30 is the price per gallon of gasoline and mpg is the vehicle miles per gallon reported by each respondent. The opportunity cost is estimated as

$$(3)\quad OC = 2\left(\frac{\text{midpoint of income class}}{(2000\ \text{hrs./yr.})\ (50\text{mph})}\right)\ (\text{one-way miles})$$

where income class is one of eleven in which each respondent classified himself. It is assumed that income is based on 2000 hours per year and that the rate of travel is 50 miles per hour.

Since it is not known how sport anglers value their time while traveling to and from Lake Erie, several alternative definitions of travel

Table 5. Estimated Travel Cost Demand Equations per Person, Number of Trips Dependent[a]

	One-way Miles	CPT1	CPT2	CPT3
One-way Miles	-0.061 (0.009)			
CPT		-0.029 (0.007)	-0.054 (0.013)	-0.140 (0.033)
Fishing Expenses per Trip per Person	-0.004 (0.005)	-0.003 (0.005)	-0.002 (0.005)	-0.002 (0.005)
Fish per Trip per Person	0.135 (0.071)	0.092 (0.074)	0.110 (0.074)	0.152 (0.078)
Days Fishing per Trip	-0.373 (0.281)	-0.940 (0.272)	-0.905 (0.273)	-0.912 (0.274)
Hours Fishing per Day	0.116 (0.174)	-0.038 (0.179)	-0.036 (0.178)	-0.134 (0.177)
Years Fishing at Lake Erie	0.105 (0.037)	0.143 (0.038)	0.137 (0.038)	0.127 (0.039)
Income Class	0.145 (0.154)			0.078 (0.161)
Size of Group (GS)	-0.229 (0.254)	-0.576 (0.266)	-0.700 (0.269)	-1.153 (0.311)
Intercept	1.795 (1.710)	12.423 (1.676)	13.021 (1.687)	4.751 (1.921)
R^2	0.252	0.185	0.191	0.189
F	22.78	9.84	10.24	8.80
N	313	311	311	311

[a] Standard errors are in parentheses under the regression coefficients.

Table 6. Estimated Average Consumer Surplus Derived from Travel Cost Models and Estimated Average Total Willingness-to-Pay per Person

	CPT1	CPT2	CPT3
Per Trip			
# Trips	7.96	7.96	7.96
Fishing Expenses ($)	51.35	51.35	51.35
Travel Cost ($)	67.18	42.79	18.42
Consumer Surplus ($)	137.66	73.94	28.32
Willingness-to-pay ($)	256.19	168.08	98.09
Per Day			
Fishing Expenses ($)	28.53	28.53	28.53
Travel Cost ($)	37.32	23.77	10.23
Consumer Surplus ($)	76.48	41.08	15.73
Willingness-to-pay ($)	142.33	93.38	54.49
Aggregate Lake Erie			
Fishing Expenses ($ mil)	25.8	25.8	25.8
Travel Cost ($ mil)	33.7	21.5	9.2
Consumer Surplus ($ mil)	69.0	37.1	14.2
Willingness-to-pay ($ mil)	128.5	84.3	49.2

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